

Notes/Reminders : Finding Slope from Multiple Reps.

Finding Slope from 2 Points

A. From 2 points:

1. Find the change in your y-values.
2. Find the change in your x-values.
3. Put the change in y over the change in x.

Find the slope of the line through the following sets of points:

Example 1:

$(-2,6)$ and $(0,4)$

(x_1, y_1) and (x_2, y_2)

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 6}{0 - (-2)} = \frac{-2}{2} = -1$$

$$\text{NOT } m = \frac{4 - 6}{-2 - 0} = \frac{-2}{-2} = 1$$

Example 2:

$(7,-1)$ and $(3,5)$

(x_2, y_2) and (x_1, y_1)

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 5}{7 - 3} = \frac{-6}{4} = -\frac{3}{2}$$

$$\text{NOT } m = \frac{5 - (-1)}{7 - 3} = \frac{6}{4} = \frac{3}{2}$$

BE CAREFUL!

*It doesn't matter what point you start with, but you must start with it for both the x's and y's. In my bad examples I started with point 2 in my y-values and then point 1 in my x-values (or vice versa). When I do this I get the wrong answer!

Try the following examples:

Independent Practice:

Find the slope of the line through the points $(-1,7)$ and $(2,-5)$.

Find the slope of the line through the points $(2,3)$ and $(5,10)$

Finding Slope from a Table

When finding slope from a table:

1. Pick *any* two points in the table.
2. Find the change in your y-values.
3. Find the change in your x-values.
4. Put the change in y over the change in x.

Example:

x	y
6	4
8	8
10	12

Using $(6,4)$ and $(8,8)$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 4}{8 - 6} = \frac{4}{2} = 2$$

OR

See...I still get the same answer no matter what 2 points I pick

Using $(6,4)$ and $(10,12)$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - 4}{10 - 6} = \frac{8}{4} = 2$$

OR

See...I still get the same answer no matter what 2 points I pick!

Using $(8,8)$ and $(10,12)$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - 8}{10 - 8} = \frac{4}{2} = 2$$

OR

**You could also find the change in y and change in x by looking at each column in the table. Then put change in y over change in x.

	x	y	
+2	6	4	+4
+2	8	8	+4
	10	12	

$$m = \frac{\Delta y}{\Delta x} = \frac{4}{2} = 2$$

$$\text{NOT } m = \frac{\Delta x}{\Delta y} = \frac{2}{4} = \frac{1}{2}$$

BE CAREFUL! Don't put x's over y's!!

Try the following examples:

Independent Practice:

Find the slope of the line represented by the following table.

x	y
-3	-1
0	1
3	3

x	y
-3	12
-2	10
-1	8

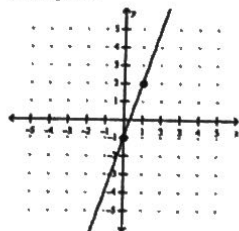
Finding Slope from a Graph

Many of you think of slope as "rise over run". In Algebra 2 land, I'll call this "change in y over change in x". These mean the same thing and are easy to represent on a graph.

When finding slope from a table:

1. Pick 2 points on the graph. (Try to pick 2 points on gridlines so that you know exactly where they are)
2. Find your change in y (how much you go up or down to get from the first point to the second).
3. Find your change in x (how much you go left or right to get from the first point to the second).
4. Put the change in y over change in x.

Example 1:

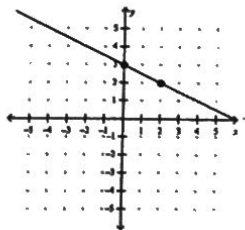


2 points on the line are (0, -1) and (1, 2).

To get from -1 to 2, I go up 3 units on the graph, so $\Delta y = 3$
To get from 0 to 1, I go right one unit on the graph, so $\Delta x = 1$

$$m = \frac{\Delta y}{\Delta x} = \frac{3}{1} = 3$$

Example 2:



2 points on the line are (0, 3) and (2, 2).

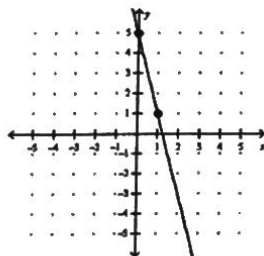
To get from 3 to 2, I go down 1 unit, so $\Delta y = -1$.
To get from 0 to 2, I go right two units, so $\Delta x = 2$.

$$m = \frac{\Delta y}{\Delta x} = \frac{-1}{2} = -\frac{1}{2}$$

Try the following example:

Independent Practice:

Find the slope of the line shown in the graph.



BE CAREFUL! → Do a double check once you've found your slope.

Remember what positive and negative slopes look like (going up as you go right, and going down as you go right). Big slopes are steeper and smaller slopes are flatter. Does your answer make sense with the picture?

Finding Slope from a Scenario/Word Problem

- When you're trying to find the slope in a situation or word problem, think about what's changing.
- Remember, slope is just another way to say "constant rate of change".
- Keywords to point this out to you are things like "each", "per", "for every".
- For these problems right now, you're literally just picking out the right number for the problem.
- The slope is always change in something per something. It will always be how the dependent variable changes based on the independent variable.

Examples:

1. I make a down payment on my car of \$7,500 and then make payments of \$230.00 per month. The amount I've paid (dependent variable) depends on the number of months (independent variable). In this case, \$230.00 per month.
 $m = 230$
2. Every time I swear, my parents make me put 50 cents in the swear jar. They empty the jar when it reaches \$20. The \$20 has nothing to do with the rate of change. The amount of money in the jar (dependent variable) depends on how many times I swear (independent variable). The constant rate of change is 50 cents per swear.
 $m = 0.50$ (if I'm measuring in dollars)
3. After going on "The Biggest Loser", a contestant who originally weights 378 pounds loses 10 lbs each week. The contestant's weight (dependent variable) depends on the number of weeks (independent variable). Since the contestant loses 10 pounds each week, the slope will be negative.
 $m = -10$

Try the following examples:

Find the slope (constant rate of change) for each scenario.

Independent Practice 1:

I go to the store with \$40 and I spend \$10 on each item I buy.

Independent Practice 2:

I have 65 DVDs right now. Every year, I add 6 DVDs to my collection.

Notes - Graphing From Each of the 3 Linear Equation Forms

1. Slope-Intercept Form: $y = mx + b$

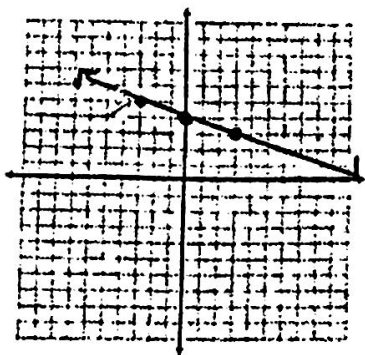
b=begin - start at the y-intercept. Put it on the graph first.

m=move - move from point to point according the slope ($\frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$)

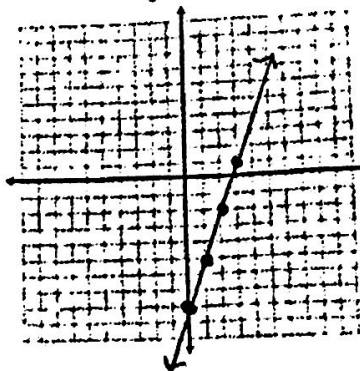
$$y = -\frac{1}{3}x + 4$$

$$m = -\frac{1}{3}$$

$$\frac{1}{-3}$$



$$y = \frac{3}{1}x - 8$$

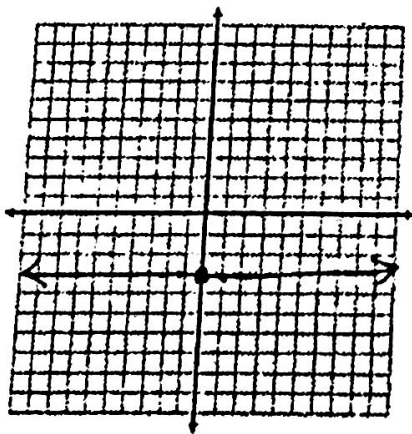


4. Special Cases - Horizontal and Vertical Lines

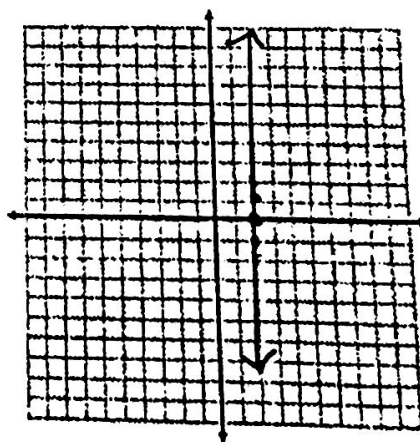
- $x = \text{some number}$ is a vertical line
- $y = \text{some number}$ is a horizontal line



$$y = -3$$



$$x = 2$$



FINDING SLOPE

Find the slope of the line that passes through each pair of points:

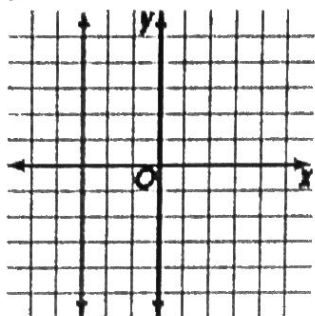
1) $(6, 8), (5, -5)$

2) $(-2, -3), (0, -5)$

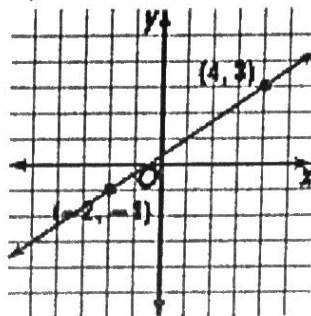
3) $(3, b), (-5, b)$

Find the slope of each of the following lines:

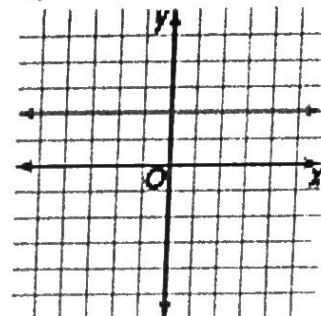
4)



5)



6)



Find the constant rate of change that fits the following tables:

7)

x	y
-1	3
0	5
1	7

8)

x	y
-4	-2
0	10
2	16

9)

x	y
-2	4
1	-5
5	-17

Identify the constant rate of change in the following situations:

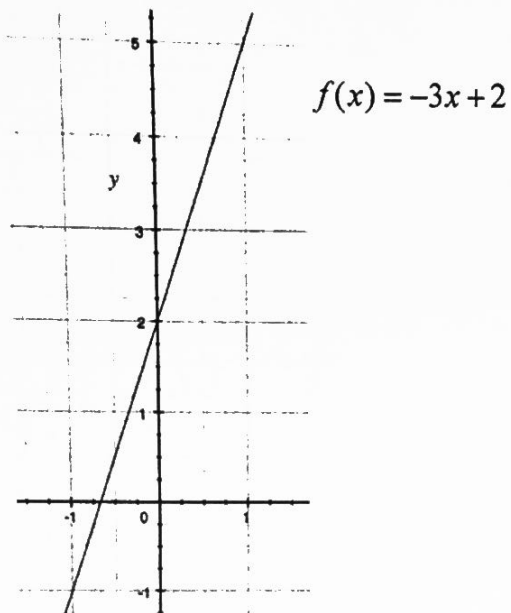
10) Your class decides to hold a carwash to raise money. You spend \$50 on supplies for the car wash and charge \$1.50 per car.

11) You go to your favorite store and see that shirts are 25% off. Now each shirt costs \$12.

12) You decide to join MovieFlix (like Netflix). There is a \$20 flat fee to join, then a fee of \$5 per month for unlimited rentals.

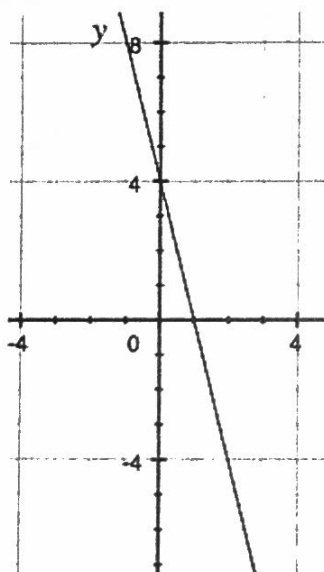
Comparing Linear Functions

1) Explain how you know the equation and graph cannot be a match.



2) Explain how you know the table and graph are a match.

x	y
-1	8
0	4
1	0
2	-4



3) Explain how you know the equation and table are a match.

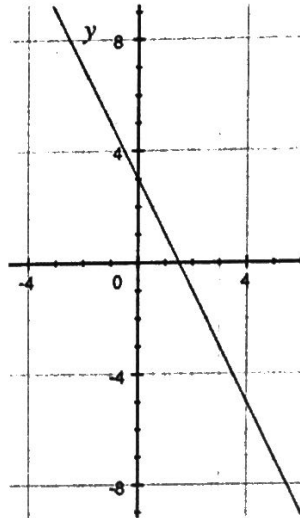
$$f(x) = \frac{3}{2}x + 5$$

x	y
-2	2
0	5
2	8
3	9.5

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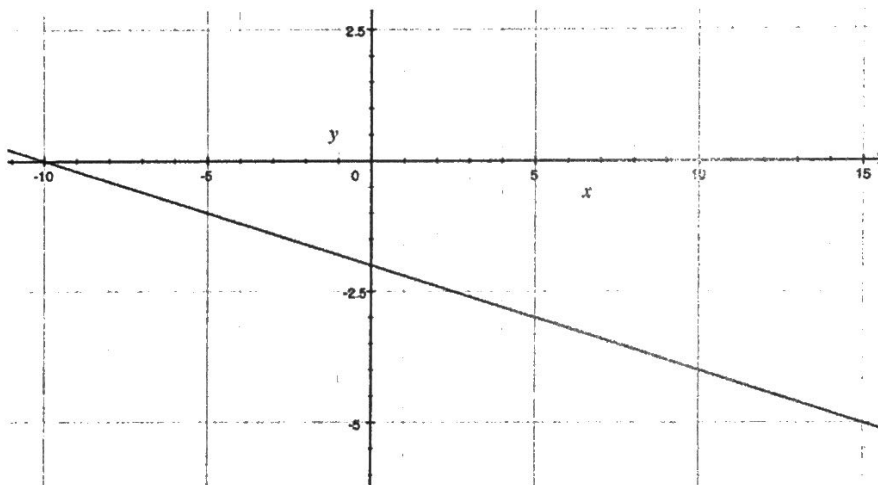
4) Explain how you know the graph and table cannot be a match.

x	y
-3	3
0	-3
3	-9
6	-12



5) Explain how you know the equation and graph are a match.

$$f(x) = -\frac{1}{5}x - 2$$



6) Explain how you know the equation and table cannot be a match.

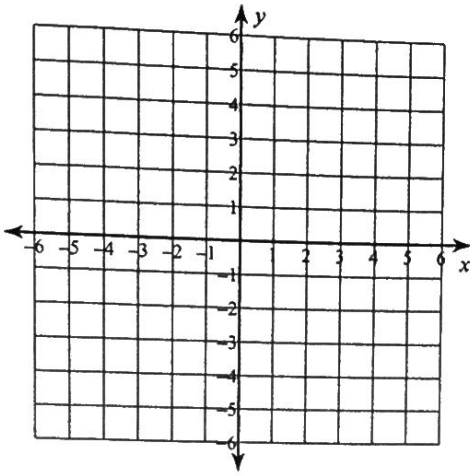
$$f(x) = -2x + 2$$

x	y
-2	-2
0	2
2	6
4	10

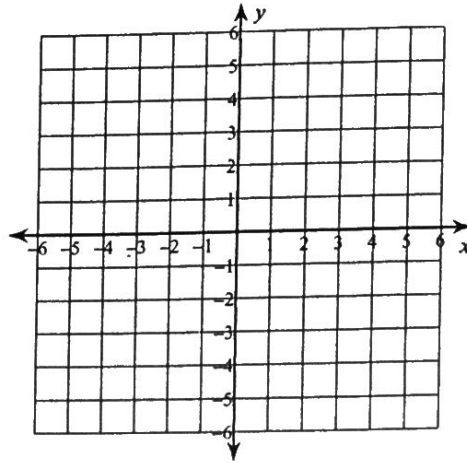
Graphing Lines in Slope-Intercept Form

Sketch the graph of each line.

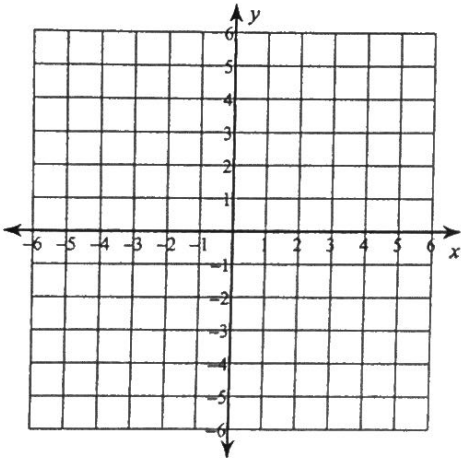
1) $y = \frac{1}{4}x - 1$



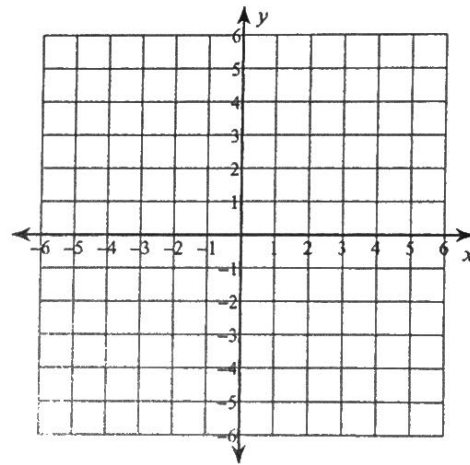
2) $y = -x + 2$



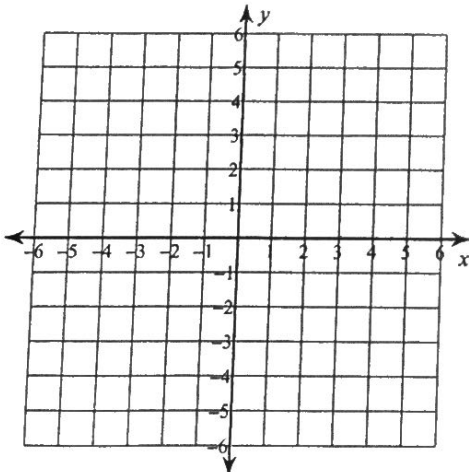
3) $y = x + 1$



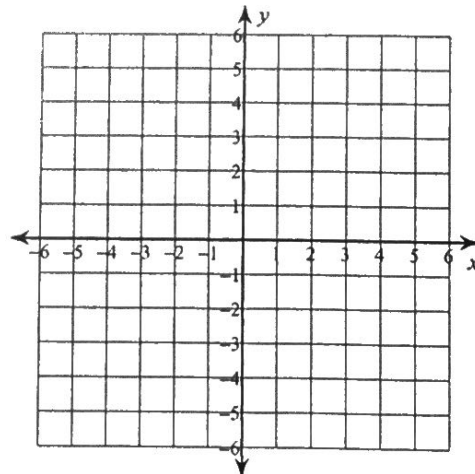
4) $y = \frac{4}{3}x - 4$



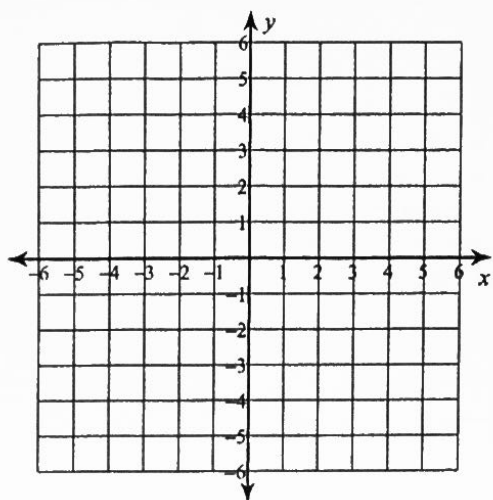
5) $y = -3x - 3$



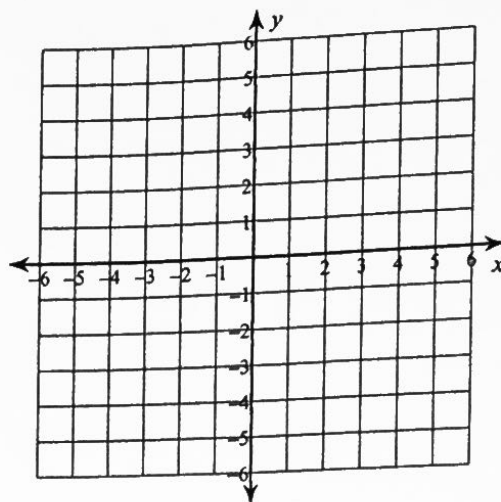
6) $y = 4$



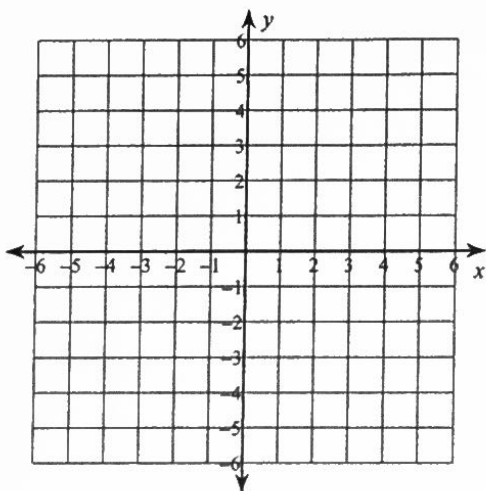
$$7) y = \frac{3}{5}x - 1$$



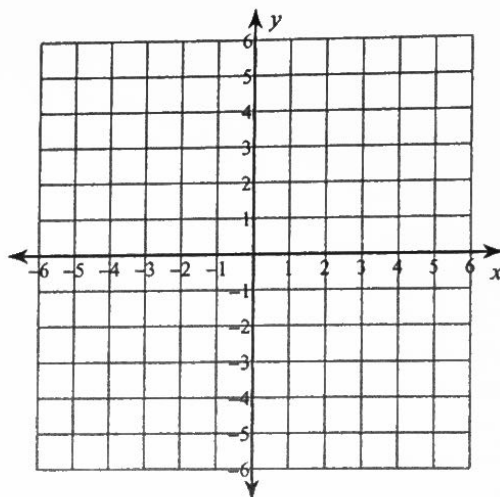
$$8) x = 5$$



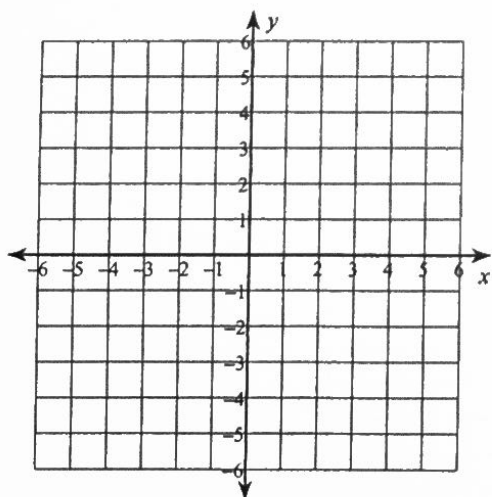
$$9) y = 3$$



$$10) y = 3x - 2$$



$$11) y = 4x + 3$$



$$12) y = \frac{6}{5}x + 5$$

